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solplan review

the independent newsletter of energy conservation, building science & construction practice

Inside . . .

Crawl Space construction is common in many parts of the country, especially on the West Coast. Building code requirements for venting of crawl spaces have created many problems, especially the way many are being built. We review a recent study that looked at current construction practices, what the problems are, and how they should be built so that there won't be any problems.

We continue with our series on space heating of houses, with a discussion of forced warm air heating systems: points to consider in their design, and installation.

Improper system installation can have devastating consequences. We report on a coroner's inquiry report of a carbon monoxide poisoning death caused by faulty equipment installation.

Construction waste management is a topic that is gaining importance. We review a CMHC document that identifies problems and opportunities on the construction site. It will the basis of a series of workshops that are coming up across the country.

Other items include reports on the Advanced Houses program, new window energy ratings programs, TRC news, and much more.

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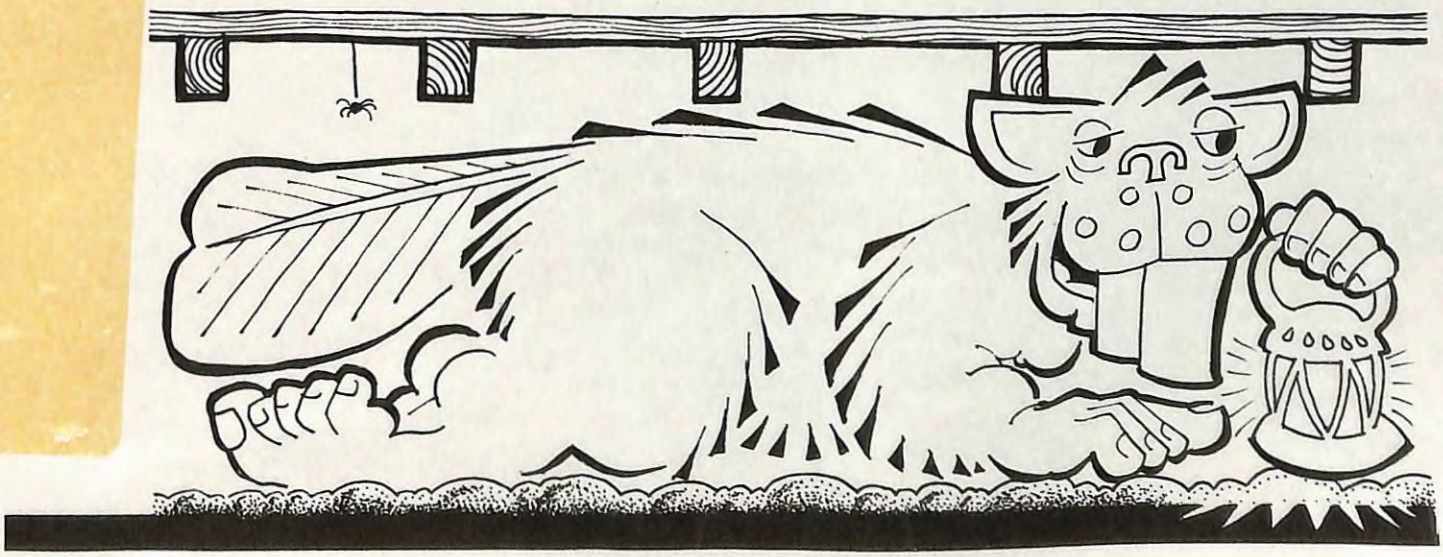

From the Publisher . . .

Why do we tolerate behaviour in business that is not acceptable on a private, individual level? We don't tolerate cheating, stealing or lying. But when it's done in the name of business activity, it seems to be OK.

The concept of ''good corporate citizen'' seems to have disappeared in recent years, as greed and fraud has become the norm. The new norm seems to be maximizing profits, regardless the consequences. The shady business practices seem to be happening at all levels, it's not just the international bank and junk bond brokers that are guilty.

It shouldn't be necessary to have to talk about business ethics, but several recent incidents have started me thinking about the ethics, or lack thereof, in the business world. While there has to be a bottom line profitability to the business enterprise (only governments can print money to cover their losses), it must be done honestly. It's not good enough to ignore the consequences of our actions, dismissing them as not part of our business, because we can get away with it.

On the West Coast we recently had the bankruptcy of a window manufacturer - not because their product couldn't stand the competition, or because of a market slowdown (soon after the bankruptcy the companies re-emerged under new management). Rather, it seems that the collapse was the result of paper shuffling, to the point that the business was bled dry of its assets, trying to corner the market on the window industry by acquisitions. To the bankers and paper shufflers, it didn't matter what the companies were manufacturing or how many people were employed. It was only numbers on paper.

Another example that has emerged is the copper tubing market. It seems that most of the product supplied (by one manufacturer with 80% of the market) for the past few years has been substandard. It was only discovered when premature failure of the copper piping started. It is hard to believe the substandard material was simply a matter of poor quality control. There are many other examples around.

Every business has a responsibility not just to its shareholders, but also to the community it serves and from which it derives its living. We expect our politicians to behave in an exemplary fashion. Why should the business world be any different? After all, honesty and integrity are the strongest assets of a business.

No one likes regulations, but they usually are introduced with the best intentions to correct flagrant abuses. If the business community does not clean up its act, it will only suffer more regulations.

Richard Kadulski
Publisher

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Crawl Space Construction

Sebastian Moffatt

Passive crawl space vents have long been seen as an effective defence against moisture build-up in crawl spaces. But because these vents are often left open in the winter and have inoperable or loosely fitting covers, they cause excessive cold air movement through the crawl space. Despite the use of crawl space vents as required by building codes, crawl spaces often have high moisture levels which can result in high humidity and condensation in living areas.

Passive crawl space vents are a major source of heat loss especially when the crawl space contains forced air heating ducts. Ambiguous wording in the Building Code and uneven enforcement of ventilation requirements by municipal inspectors manes that in some municipalities builders are required to install exterior wall vents whether or not crawl spaces are heated. In non-forced air houses some inspectors require builders to install and operate electric baseboard heaters in the crawl space all winter - even if it is meant to be unheated! This has lead to frustration and complaints from builders, and a continuing series of appeals to the B.C. Building Standards Branch.

Crawl spaces are not unique to B.C., so the basics apply wherever they are part of a building design.

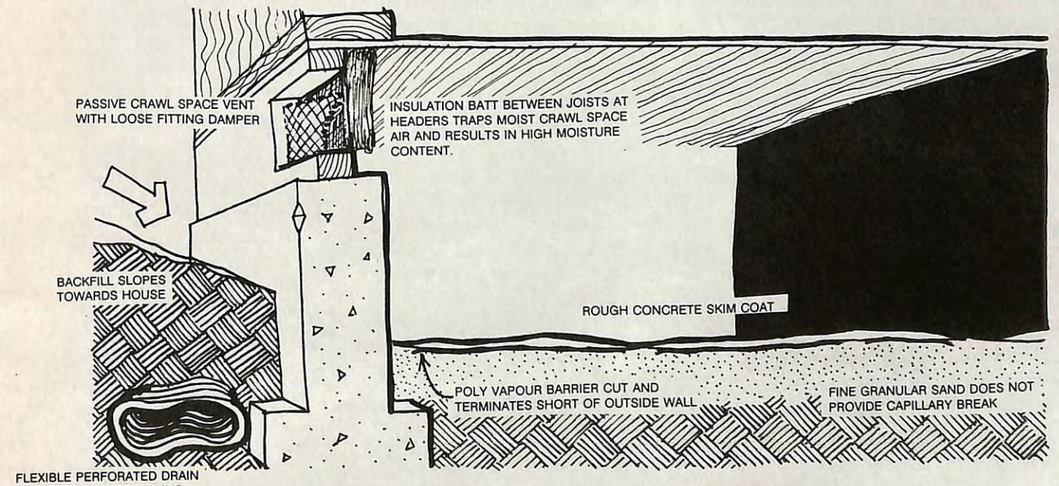
Part of the problem lies with builders who want the best of both worlds. To lower insulating and plumbing costs they choose to treat the crawl space like a shallow basement, insulating the walls and not the slab or floor (this also creates useful storage area). But for heating and ventilation purposes it is easier to treat the crawl space like wall or attic cavities, and simply ignore any distribution or delivery of heat and air. This means high heat loss as from piping, forced air ducting and through ground floors.

A study to investigate the nature of the problems has just been completed by Sheltair Scientific.Ten Vancouver area houses were studied. They included similar types of crawl space construction with different types of heating and crawl space ventilation systems (ie. vented or non-vented, forced-air or radiant heated). 3 of the problem houses had inadequate moisture barriers. Moisture was directly attributable to the lack of an effective moisture barrier, despite the presence of a 50 mm concrete slab.

Test results showed that crawl space air leakage, excluding installed ventilation, was high enough to assure a natural air change of 0.35 air changes per hour with only a small temperature difference and light wind. It was also discovered that none of the vented crawl spaces had enough vents to meet the code requirements for installed vent area (0.1 m^2/50 m^2 of plan area).

Extensive cracking of the concrete skim coat was found in all houses. The cracks did not damage the polyethylene moisture barrier where it was present. Even though the skim coat was often cracked, the poly protects the crawl and kept it dry. High wood moisture content was also measured in areas behind the joist header insulation.

The use of crawl space vents has been an attempt to compensate for inadequate or



TYPICAL PROBLEMS SEEN IN CRAWL SPACES

ineffective drainage systems and moisture barriers. A better approach may be to eliminate the vents in heated crawl spaces, and apply the cost saving towards improving drainage systems and moisture barriers.

Perimeter drainage tiles should be designed for easy testing, clean-out, and should be connected to the floor area through drains installed in the footings. Fine granular sand commonly used under slabs does not provide an effective capillary break and should be substituted with a coarse granular fill at no additional cost. Better application of insulation materials on the interior wall surfaces of crawl spaces is needed to raise thermal efficiency and reduce surface condensation. Heat radiation and air leakage from ducts in a typical forced-air crawl space should be taken into account when calculating heating requirements.

The main reason for vents in a heated crawl space is to ensure adequate drying during the non-heating season. A number of recent research reports have indicated that passive ventilation may often be unnecessary or ineffective. Ground-level air moving through passive vents in the summertime may supply little heat and drying and on cool days and nights may actually contribute to condensation in crawl spaces.

Most householders have never been informed that passive vents are to be opened in spring and closed each fall, if they're even aware of them in the first place. Vents are frequently inoperable (due to distortion by sunlight, poor installation, or settlement of structural members), or permanently plugged with insulating material.

Problems found elsewhere

Crawl space moisture problems are not just a temperate climate condition. A study in Norway House, Manitoba, found many moisture problems inside crawl spaces were caused by inappropriate construction practices. Opening vents in the spring to dry out the crawl space actually increased crawl space moisture levels as the outdoor air is moist and crawl space walls cold. This was a limited study of cold climate bungalows but, it points out the problem is not exclusive to mild coastal B.C..

A crawl space study by Lawrence Berkeley Labs in California also found that as much as 50% of the Radon gas released into the crawl space, will enter the living space. While the focus was on radon infiltration, the results are also valid for some aspects of moisture entry and for other types of soil gases.

Another study, sponsored by the USDA forest products lab found that a reasonably effective moisture barrier was adequate to control moisture, without any crawl space ventilation.

Research by Dow Chemical to develop the Perimeter Insulated Raised Floors (PIRF) system for crawl space insulation and ventilation found that the use of an effective barrier allowed builders to reduce to 1/10th of the ventilation requirements in the California Uniform Building Code. The PIRF system uses an extremely effective moisture barrier sealed to Styrofoam SM R5 board insulation.

Current Construction Practices

Foundation drainage systems were similar in the Vancouver houses. They were generally a single 100 mm plastic flexible perforated drain tile (big O) placed at or below footing height, terminating at a collection box or sump. No special measures were taken to avoid potential drainage problems. None had clean outs or risers located to easily test or service foundation drains.

Four of the houses had no poly vapour barrier under the concrete. Not surprisingly, these were 4 of the 6 houses with problems. In two of the houses, concrete was observed to have thinned to nothing in some locations, exposing poly and sand. In the house with no poly the area where the thinning was observed was noticeably wet compared to other areas.

The minimum requirements are for insulation to extend to below the frost line. Poorly applied rigid insulation can actually create condensation along concrete walls above grade, especially if humidity is high.

Air tightness testing of the crawl spaces was done on 9 houses with a door fan. The average vented crawl space leakage area was 1920 cm^2 including the installed vent leakage area and the accidental leakage area around the sill plate. The biggest leakage area was 15% more than the code required (.1 m2/50 m^2) even through the installed ventilation area was only 67% of the code requirement. All other houses measured well below the code requirements (even when accidental leakage was taken into account).

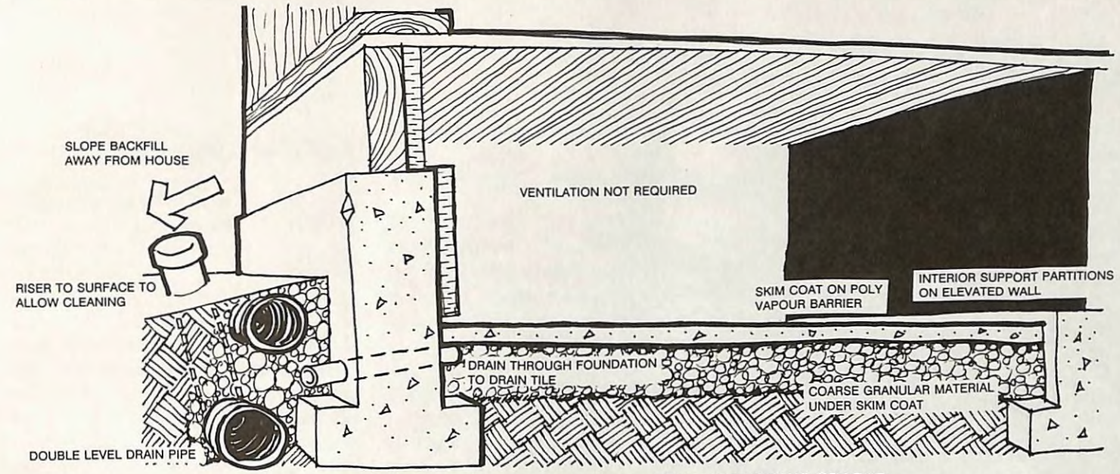
On average, forced air houses had a leakage area 510% larger than the radiant houses on the floor separating the house from crawl space. Duct leakage and supply air outlets make up most this difference.

How to build trouble-free crawlspaces?

What has to be considered for a problem free crawlspace? Some sites require a comprehensively designed moisture control system to control ground water levels that may be above the level of the crawl space floor.

Where water tables are known to be high site conditions should be investigated to assess drainage requirements. This may only be economical for multi-unit projects (or in new subdivisions as they are being laid out).

Backfills should be graded so that rain run-off is diverted away from the foundations - always grade backfill to create a small slope away from the house. Foundation drainage systems should have clean-outs to provide easy maintenance. If silting happens, this will make it easier to clean. Flexible foundation drains (big 'O') is cheap but has low strength and is easily blocked, which is why some municipalities are already refusing to allow the use of big O.



EFFECTIVE MOISTURE CONTROL SYSTEM FOR HEATED CRAWL SPACES
(mild climates such as B.C. some additional heat may be required in colder climates).

Fine granular sand used under slabs (common in the lower mainland of B.C.) does not provide an effective capillary break. Coarse gravel does a much better job.

A drain through the footing to the foundation drain tile should be provided in combination with a coarse granular layer beneath the slab. This allows any water that may accumulate to drain into the perimeter drain system.

As a moisture barrier system, it is not crucial that the poly be overlapped or sealed at the edge, or that it be free of puncture holes. However, the poly should not be punctured on purpose. Lapping the poly around the slab-edge to the inside of foundation walls is impractical. But damproofing of the inside of crawl space foundation walls would reduce crawl moisture production.

Damproofing the top of foundation walls is important because of capillary water rising through the unprotected footing. This is why sill plate gaskets are important.

Proper application of insulation materials to the interior wall surfaces of crawl spaces will reduce the amount of moisture moved into the crawl space.

Interior support walls resting on crawl space floor at slab level absorb high amounts of moisture at the sill plate if they are not properly protected. When the walls sit on a curb above the skim coat level, they are protected better and the problem disappears.

Crawl space vents are an inappropriate moisture control system compared to an effective poly vapour barrier. Operable crawl space vents are not always properly used. Accidental air leakage into crawl spaces provides enough ventilation through infiltration and wind pressure. (a most louvred vents are poorly made, when dampers are closed the open area is reduced by only 60 - 70%.

Crawl spaces used as warm-air plenums are rare and code references to them have caused unnecessary confusion among builders and inspectors. Crawl spaces with forced air duct systems are different than crawl spaces in radiant heated houses, due to the additional air change and heat loss caused by ducting.

Heat radiation and leakage from duct work in a typical forced-air heated house crawl space are enough to keep the crawl space at 15°C (Vancouver design temperature). In colder climates some additional heat may have to be supplied.

In a radiant heated home without vents, a floor grille(s) or a duct could be installed in the ground floor to ensure adequate mixing of air in the crawl space with air in the rest of the house. Extra heat to crawl spaces in radiant heated homes does not appear to be essential based on the limited testing undertaken in this project.

The use of crawl space vents has been an attempt to compensate for inadequate or ineffective drainage systems and moisture barriers. Field surveys and test results indicate that the crawl space vents are not being installed and operated in a manner consistent with building codes, and that even where vents have been used correctly they are ineffective as a moisture control strategy. A better approach would be to eliminate the vents, and use the money to improve drainage systems and moisture barriers.

From: "Investigation of Crawl Space Ventilation and Moisture Control Strategies for B.C. Houses" prepared for CMHC by Sheltair Scientific, Vancouver.

Forced Warm Air Heating

Richard Kadulski

Forced warm air heating systems are probably the most common heating system used in Canada. As with all heating systems, they have their advantages and disadvantages.

While alternative heating systems have been around for some time, their use has only increased as new equipment improves and marketing strategies emphasize the short comings of the competition.

FWA systems rely on a central heat source (i.e. furnace or heating element) to heat air, which is then circulated to distribute the heat. Typically, the whole building is a single zone so the temperature distribution is controlled by a single thermostat.

Heat Sources

F.W.A. systems usually rely on furnaces fired by natural gas, oil, electricity or wood. Occasionally, FWA systems can get their heat from a hot water boiler fan coil unit. (Where the water is circulated through a coil that resembles a radiator which heats the air passing in front or through it).

Furnace efficiency measures the effectiveness of converting the fuel into useful heat, but the efficiency of the installed system can be severely compromised by poor installation.

While furnaces may be very efficient at extracting the heat from the fuel source, the blower motors they use are very inefficient. Is this significant? Fan motors can draw 500 - 600 watts of electricity which adds up to a significant quantity of power when you consider that the trend today is to have the fan run continuously to provide continuous air circulation of ventilation air.

New equipment, such as the new Bryant and Carrier furnaces use DC powered blower motors. These are much more efficient (drawing less than 100 watts) and allow infinite variability of blower speed without any penalties of noise.

These high efficiency furnaces cost about $800 more than the mid efficiency units - but their benefits have a pay back too: they are about 10 - 12% more efficient, and with the higher efficiency D.C. motors they can save at leat $50 per year in electricity.

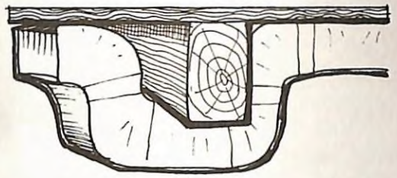
Distribution

It's not the ducts that distribute heat - it's the air, heated by the furnace that delivers the heat. In order to ensure a proper distribution of heat, the air is channelled through ducts to the extremities of the building or to sources of maximum heat loss (this is why registers are usually located under windows).

The heat capacity of air is small when compared to water. 1 litre of air can hold a small fraction of the heat that one litre of water can, which is why a 1" diameter pipe is adequate for hydronic systems while a forced air system may need a 10" x 24" plenum or more to move an equivalent amount of heat.

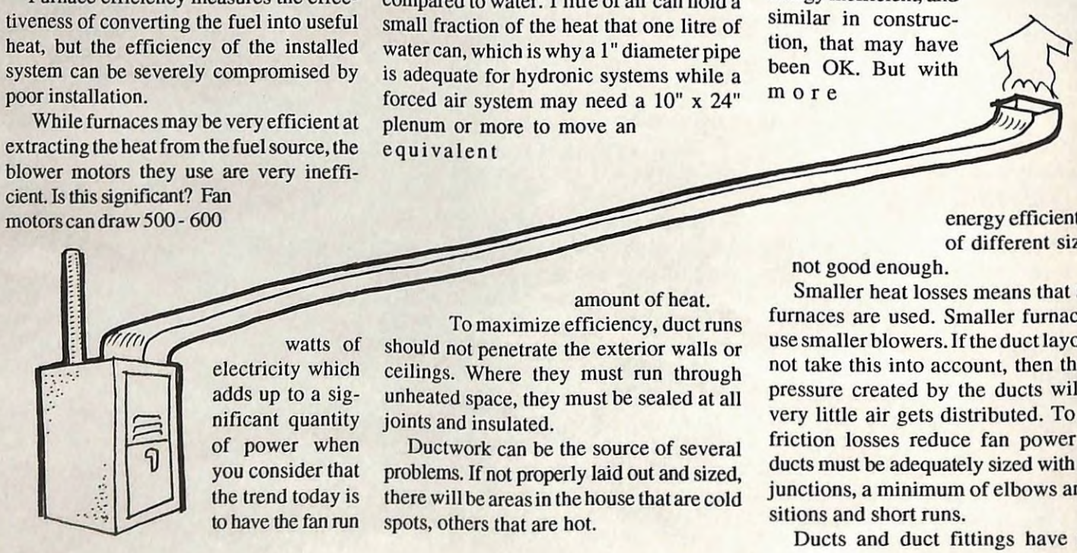
To maximize efficiency, duct runs should not penetrate the exterior walls or ceilings. Where they must run through unheated space, they must be sealed at all joints and insulated.

Ductwork can be the source of several problems. If not properly laid out and sized, there will be areas in the house that are cold spots, others that are hot.



As everyone knows, large ducts often are in conflict with the structure. Who has not encountered the ugly drop in places you don't want them because it was the only place for the heating duct? Or the neat layout that puts all the ducts between the joists except for the flush beam that's been forgotten about?

It has been common to size heating systems including the duct layout by rule of thumb. As long as houses were very energy inefficient, and similar in construction, that may have been OK. But with more energy efficient houses of different sizes it is not good enough.



Smaller heat losses means that smaller furnaces are used. Smaller furnaces also use smaller blowers. If the duct layout does not take this into account, then the static pressure created by the ducts will mean very little air gets distributed. To reduce friction losses reduce fan power needs, ducts must be adequately sized with smooth junctions, a minimum of elbows and transitions and short runs.

Ducts and duct fittings have not received much attention for a generation or two.

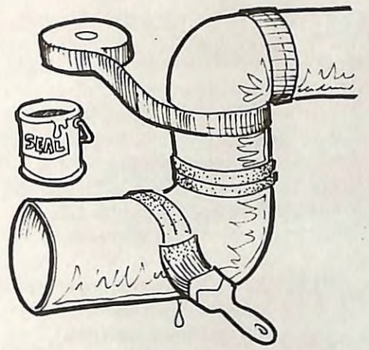
I first encountered a problem with poor layout (and it was embarrassing at the time) about 10 years ago in one of my earlier low energy houses.

The house heat loss was very small with substantial solar gains so we installed the smallest furnace available that could supply enough heat. Unfortunately, the house layout meant there were some very long runs. Sure enough, a couple of rooms at the end of the long runs were not getting enough heat simply because there was not enough air moved through the duct. To correct the situation some expensive fine tuning of the system was needed. If enough attention had been given to the duct design at the time, we would not likely have encountered the problem.

Traditional distribution systems have worked by brute force: the system is so over sized that the blower will always move enough air, but high air velocities are also the source of the complaints about drafts and dust: the major complaint against FWA systems.

The higher the volume of air (or the higher the velocity) the more likely it will create undesirable drafts. Why? Moving air is the main way our body is cooled. Just think about those muggy summer days: if there is no breeze it can be unbearably hot. So what do we do? We get a fan to blow air at us. The air will be at exactly the same temperature but its movement past us speeds the evaporation from our skin, so we feel cool. In winter, drafts cooling us off are the last thing we want. Standard furnaces only blow air at one (sometimes two) speeds. The high volumes of air moved are a reason you get complaints.

In addition if the unit moves air in large velocities (and especially if intermittently) unless there is an effective filtration system a lot of dust will be moved around.



Controls

Standard FWA systems rely on a single thermostat.

Depending on the size and configuration of a house, this usually is adequate, but care must be paid to where it is located. If close to a register, wood stove or fireplace, or in a sunny south facing room there could be problems as these will distort the thermostat functions.

New equipment manufactured by Carrier (also marketed under the Bryant label) have electronic controls that allow a number of zones in the house. This allows a house to take full advantage of solar gains on the south side while at the same time maintaining the shady north side comfortable.

Noise

Two types of noise generate the objections. One is the hum generated by motor speed controls. If the motors are not shaded pole, then they can generate considerable noise.

There is no reason why you should have to listen to your furnace fan all the time. Quiet is attainable.

The other is caused by the layout and assembly of the ducts themselves, as noise is conducted through the air and the ducts themselves. The noise generated by the air flow itself can easily be dampened by installing a flexible acoustical collar near the supply outlet.

Expansion and contraction of the ducts - especially if the ducts are restrained and do not allow for much movement, can create creaking and cracking sounds.

Aesthetic considerations are a factor why other heating systems are being used more often the design of the visible elements - the floor grilles by and large leaves something to be desired. It seems that they are an element that has never been paid attention to.

New COFI Publications

Three COFI Plywood Technical Publications: the **Plywood Handbook**, **Plywood Design Fundamentals** and the **Plywood Concrete Form Guide**, have been updated and revised to conform to new 1990 National Building Code standards.

Design calculations in all three of these publications are based on Limit States Designs, which make wood compatible with steel and concrete design methods. Canada is the first country in the would to adopt reliability based design methods in its National Building Code.

For information: Council of Forest Industries of B.C. 1200 - 555 Burrard St Vancouver, B.C. V7X 1S7

Change of Address:

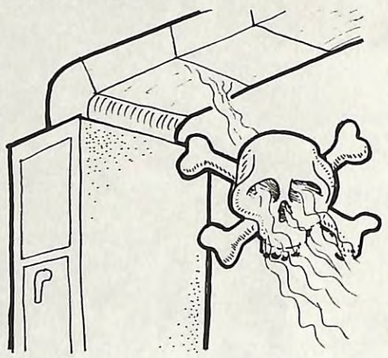
Nutech Energy Systems Inc. manufacturers of the **Lifebreath** series of Heat recovery ventilators have moved to:

511 McCormick Blvd.
London, Ont. N5W 4C8
Tel: 519-457-1904
FAX: 519-457-1676

Heating Systems can kill!

Proper equipment installation is important. The installer who misses even a small sheet metal screw when doing a furnace installation can contribute to a person's death. This was a key conclusion of a B.C. coroner's report on the carbon monoxide poisoning death of a woman in Prince George last December.

A faulty gas furnace in a mobile home spilled enough Carbon monoxide (CO) into the home to poison the occupants. The owner was rushed to hospital with a suspected heart attack (it was determined to be a high level of CO (21%).



As a smell was noted, the gas company was called. The serviceman checked for gas but found none. He checked the furnace, gas stove, valves and lines, inside and out. He felt there were no gas leaks and the furnace was operating properly, but a routine check for the presence of carbon monoxide wasn't done.

The next day the man's wife was dead. The autopsy found her system had 71% CO.

The problem was a crack in the heat exchanger adjacent to the flue outlet. The venting system was above the furnace. The outer 8 inch fresh air pipe was in the proper position but the inner 4 inch combustion products flue pipe was disconnected from the vent collar.

The pipe, in this furnace model, is supposed to be secured to the vent collar by friction and a sheet metal screw. The installer had not put in the screw that was required for the inner flue (other models of this style and design do not require such a screw).

As the combustion flue was not secure, the combustion gases being vented from the furnace could mix with the cold air brought in by the outer pipe. The mixing of the hot and cold air created condensation that ran down into the furnace, against the heat exchanger above the fan, causing it to corrode and weaken. The products of combustion mixed with the fresh air being taken in and created incomplete combustion.

As the weather was cold at the time, the furnace was working hard, putting stress on a weak portion of the heat exchanger. The weakened area of the heat exchanger cracked from the stress distributing products of incomplete combustion, including CO, throughout the trailer via the heating ducts.

The Coroner's Inquiry recommend ed that manufacturers of furnaces consider standardizing the method by which flues are attached to furnaces.

It also suggested that installers be reminded that furnace flues are attached to furnaces differently. They should review the manufacturer's installation literature, supplied with each appliance, before installing the appliance and then ensure the work is done according to those instructions.

When a serviceman is sent to a place where there has been a complaint of a gas smell, the area should always be checked not only for gas but also for carbon monoxide.

What are symptoms of CO poisoning?

Shortness of breath, headache and nausea are often noticed when the level of CO gets to 20%. Fainting and heart arrhythmias are evident at 40%, while 50% levels will cause coma and convulsions, and 60% will cause cardiovascular collapse and respiratory failure. As a person ages and their heart is compromised with heart disease, the symptoms can become evident at much lower levels.

Copper Piping Alert

Copper piping is supposed to last a long time. The normal life expectancy of copper tubing for potable water is in the range of 20-35 years.

Recently, premature corrosion of copper tubing has caused concern in B.C. The province has one of the highest standards for thickness of copper pipe due to the corrosive water conditions in many regions of the province. There are essentially three types of copper tube used in water distribution systems - Type K, Type L and Type M. Type K and L are approved for use in B.C. Type M, the thinnest, is not permitted for use in a potable water distribution system.

Reports of systems failing within seven years of installation (mostly with the commonly used Type L tube). The early failure is caused by a number of factors including quality of water, design, of piping systems and failure of the tube to meet standards. (The B.C. Plumbing Code requires copper tube for water service to conform to ASTM Standard B88.83A "Seamless Copper Water Tube".)

The problem is mostly applicable in commercial and multi family projects that are plumbed exclusively with metal plumbing and operate at higher pressures.

A recent study for the province by Warnock Hersey Professional Services Ltd. on type L copper tube found that 80% of the samples tested were substandard (with respect to wall thickness and weight requirements). Of the twenty-five samples tested, only five were found to comply with the chemical composition, wall thickness and weight requirements of the standard ASTM B88-88.

The B.C. Building Standards Branch issued a bulletin recommending that enforcement authorities only accept copper water tube that has been certified by Warnock Hersey Professional Services Ltd., or the Canadian Standards Association to ensure that the tube complies with the requirements of B.C. Plumbing Code. It is also recommending that third party certification of copper water tubing, which will include in-plant inspections, be made

OOPS! The phantom of the computer struck again!

In the last issue, the computer clipped an item a reader's letter. As we got several enquiries about what was lost, we are reprinting the whole letter .

Sir,

How about a contest design for a 'zero energy' house, with minimum cost over its life cycle (say 50 years)? Cost can be defined as the capital cost plus interest plus energy consumption. Set the interest at 10% and energy cost increases at 10% a year. The first prize to be an all expense paid trip to Kuwait, second prize an all expense paid trip to Calgary, third prize a one year subscription to 'Oil Week'.

Financing is becoming very difficult for almost anyone of modest means. I suggest that as a long term solution utilities like B.C. Hydro could get into finance. If they were to finance the extra cost of an R2000 or zero energy house (up to $10-20,000) the owner could pay off on his monthly utility bill over say 20-30 years at very low interest - say inflation plus 1% for administration. Homeowners would thus get the benefit of the preferential financing rates that large utilities enjoy.

This would give the utility a certain, significant reduction of energy consumption. The total energy savings of the house over a 30 - 40 year period would pay for a major part of the total cost!

This scheme would give low income people a boost and also give the housing industry a shot in the arm. I t would also make B.C. a world leader in energy efficient technology which could be exported. This program could also be extended to industry and make all of our industrial sector far more competitive.

It seems to me that Hydro if it were far-sighted and innovative, they could raise funds for this type of program by using the monthly Hydro bill as a monthly 'financial statement'. Customers could sign up to be 'Energy Investors' by paying $ 5 to 50.00 or more each month extra on the bill. The extra would go into a 'Zero Energy' fund that would get a dividend or interest on the investment each year. They can take it out at anytime. The interest rate would have to be very low to make it work but many 'greens' might go for it.

Baron Fowler
Fulford Harbour, B.C.

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RADON: The Invisible Threat
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Toronto	Oct. 28-29, 1991
Winnipeg	Nov. 13-14
Vancouver	Nov 18-19
Calgary	Nov. 21-22
Montreal	Nov. 27-28
Halifax	Dec, 2-3
Ottawa	Dec. 5-6

For information/registration contact: Lorie Boudreau at (613) 996-6157

BUILDING SCIENCE INSIGHT '91
Building regulations Who writes building codes and standards? Who enforces them? What happens when there's a conflict? What are the regional variances? Who can give you a reliable opinion on a building code requirement? How do you know if a product or building conforms? The answers are available in a One-day Seminar

English language:

Calgary Oct 21	Saskatoon Oct 23
Winnipeg Oct 25	Ottawa Sept 25
Edmonton Oct 7	Montreal Oct 31
Vancouver Oct 9	Toronto Nov 4,5,6
Whitehorse Oct 11	Yellowknife Nov 8

en francais:

Ottawa Nov 20	Quebec Nov 22
Montreal Nov 27, 28	

Information: BSI'91 - Technology Access Group; Institute for Research in Construction
National Research Council Canada
Ottawa, Ontario K1A 0R6
Fax: (613) 954-5984

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CANMET

ADVANCED HOUSE PROGRAM

Call for proposals

CANMET, the Canada Centre for Mineral and Energy Technology — the research and development arm of Energy, Mines and Resources Canada (EMR) — in partnership with the Canadian Home Builders' Association (CHBA), is now accepting proposals for the Advanced House Program.

Houses built as a result of this competition must:

- Feature technologically innovative, energy efficient and environmentally sensitive products and concepts.
- Meet stringent technical requirements.

Proposal Deadline: October 21, 1991

To receive your proposal package, or for more information, contact:

Tim Mayo, Program Manager
CANMET
580 Booth Street
Ottawa, Ontario
K1A 0G1
(613) 996-3089

John Broniek, P. Eng.
Technical Coordinator
CHBA
200 Elgin Street, Suite 502
Ottawa, Ontario, K2P 1L5
(613) 230-3060

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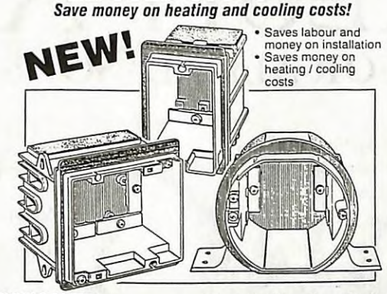

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HOT 2000

WHAT IS IT?

HOT2000 is an advanced approach to the design and modelling of energy efficient structures.

HOT2000 is an easy-to-use computer program designed to assist builders, architects and engineers design low-rise residential buildings. Utilizing current heat loss/gain and system performance models, the program aids in the simulation and design of buildings for thermal effectiveness, passive solar heating and the operation and performance of heating and cooling systems.

WHAT CAN IT DO FOR ME?

HOT2000 lets you input comprehensive data on proposed building design, analyze the expected heat loss/gain, and revise and test altered designs until a satisfactory design is achieved.

Contains extensive weather data, several models for HRV, foundation, water heating systems and more.

HOW TO GET HOT2000

HOT2000 is available from the Canadian Home Builders Association (CHBA) in either a Canadian or U.S. version at the following prices:
* $120.00 (Cdn) for the Canadian version
* $150.00 (US) for the USA version (contains US weather data)

Price includes User and Reference Manuals
Canadian residents: please add 7% GST

To order HOT2000, complete the attached form and send it with a cheque or money order to:

HOT2000 Sales
CHBA, Suite 702,
200 Elgin St.
Ottawa, Ont. K2P 1L5
Tel: (613) 230-3060

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Telephone No.

mandatory at the national level (at the moment, the industry is self regulating, with no third party certification).

The recommendation has sent shock waves through the B.C. construction industry. This is especially of concern in larger scale multi family residential and commercial projects where all plumbing will be copper, and corrective action is expensive, either at the time of construction, or for the residents shortly after project completion when the plumbing fails.

Two manufacturer's products were inspected: Wolverine and Cerro. Wolverine tubing was manufactured in Canada and all Cerro or S Cerro tubing was manufactured in the United States. Samples stamped "Wolverine" had, on average, mean weights of 6% below requirements. Other samples had, on average, mean weights of 9% below the requirements.

One of the samples stamped "S Cerro Type L" had a minimum wall thickness of 20% below the requirements. Samples stamped "Wolverine-L" had, on average, minimum wall thickness of 8% below the requirements. Other samples had, on average, mean wall thicknesses of 14% below the requirements.

The dilemma is that Wolverine has about 80% of the copper tubing market in Canada. (this is competition?). Fortunately, the impact on small scale residential is smaller, and many plumbers are using plastic piping.

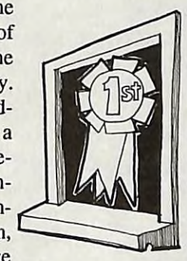
It is ironic, but at the same time as the story was breaking in B.C., the Canadian Copper Industry's Canadian Copper bulletin had a story on Copper Water Tube vs Polybutylene Plastic Pipe. It was a not too subtle dig against the use of plastic piping, stressing the positive

attributes of copper piping. Too bad that a lack of quality control on the part of the manufacturer of the majority of copper piping (or was it accidental on purpose?) undermined their efforts.

Super Window Competition

How to encourage innovation and development of new products ready for commercialization?

It's easy to make a new product on an experimental one-off basis. But it doesn't always translate easily to the assembly line. In Sweden they have come up with an innovative way of bridging the gap between the laboratory and the factory. Swedens's National Energy Administration, together with a group of the country's homeowner's associations, is sponsoring an international super window procurement competition, the winner of which will receive an order for 5,000 units of their product.



There will be no second prize: It's a winner take all competition.

Sweden's innovative Technology Procurement Competition has already granted awards for efficient refrigeration and freezer units. Windows are next. After that ballasts in fluorescent lighting and other products will be on the list.

Announced in Mid-May the contest runs until October 1, after which all entrants will have had their products compared using both computer analysis on the Canadian-developed FRAME program, as well as laboratory- testing. Contest comparisons will include the standard energy performance criteria of U-value, air-infiltration and solar gain, as well as other parameters such as weight, maintenance, and sound-dampening properties.

It is possible to improve the end use of energy. Despite gains made recently window efficiency can still be doubled. The program aims to strengthen the demand side of the market.

Perhaps we should be taking a lesson from this program. It may offer more significant results than just grants or tax credits.

Silencing "Water Music"

Has anyone not had any problems with plumbing noise? Fortunately, new building techniques and greater use of plastic seems to have reduced the problem - but it does not mean it won't happen. Metal pipes expecially are vulernable to noise.

Pipe vibration is transmitted to the building structure which vibrates drywall and generates noise. Acousticians have known in a general way that soft materials reduce vibration transfer. Recently, the National Research Council's IRC Acoustics Section confirmed this and found that minor changes in construction can silence plumbing noise in residential walls.

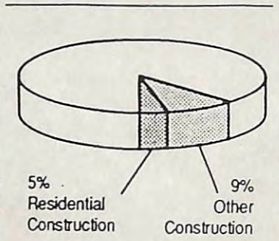
The experiment generated turbulence and noise on an experimental piping system. They wrapped different soft materials around the piping to prevent solid contact with wall then simulated flushing and showering.

The results showed that the more resilient the pipe-wrapping, the better the noise reduction. For example, soft, closed-cell neoprene wrapping, reduced noise by 20 decibels (a four-fold reduction in noise to human ears). Resilient metal channels in the wall further reduced the noise by 15 decibels.

The experiments also revealed that noise from sinks draining and toilets flushing can be controlled by ensuring pipes don't touch wall structures - wrap pipes with resilient material before applying clamps. In addition, the heavier the pipe used for carrying waste water, the greater the noise reduction. (which is why the old cast iron plumbing stacks were so quiet).

Reducing Residential Construction Waste

Construction waste has become a problem in almost every area of the country. Bans and restrictions on certain types of materials are already in place, and more are being considered all the time. Waste audits and waste management plans will become necessary components of the renovation and construction process.



Wastes Taken To Landfill

Residential construction is a major contributor to the waste stream. Demolition of buildings, renovation of older houses and the wastes produced in new home construction represents more than 5% of the total volumes of wastes currently taken to land fill sites. Non-residential construction adds a further 9%.

CMHC has prepared a book and video that focuses on the three R's: Reducing waste at source; reusing what would normally be landfilled; recycling materials for which there is no immediate reuse.

Opportunities

A waste management plan offers potential financial benefits to the builder and renovator. Cutting back on the wastes slated for landfill can reduce the cost of materials purchased for a project; reduce haulage and tipping fees and create a source of revenue through the resale of used goods and materials.

Not all the benefits from improved waste management procedures are monetary. They improve efficiency through altered demolition and construction practices; improve the energy-efficiency of the building envelope by reducing the amount and types of materials through which heat loss can occur; and can improve the company's public image by demonstrating a responsibility towards the environment.

The Waste Management Plan

Waste reduction plans built around the 3 R's of waste management: Reduction, Reuse, and Recycle. Before starting, you need to know what kinds and what volumes of waste are being produced; how the wastes are collected and stored and at what cost; how and where your wastes are being disposed; and what your costs are for haulage and tipping fees.

It means tracking what ends up in the garbage bins over a period of time long enough to tell you what waste your average construction job produces. For a small builder that may mean tracking only one or two houses.

Demolition of existing buildings is the largest contributor of waste. For a typical kitchen renovation and small addition, 2-3 containers (8-12 tons) of waste is typical. In some areas of the country, 5 to 8% of the total job cost is disposal.

New construction requires smaller amounts of disposal but still as much as 2-tons of waste are produced building an average house. The disposal costs of this waste can be up to 4% of total costs.

Regulations

Be aware of current restrictions in your area. Many municipalities now have Waste Management Coordinators on staff that can help.

Reduce

Reduction is the most efficient and effective option, as it means producing less waste to begin with. It should be viewed as a sound business practice.

Waste volumes can be reduced through smart purchasing and handling practices by: reducing the amount of packaging left at the site by suppliers; purchase materials such as fasteners, paint, caulking, and drywall mud in bulk containers; buy more durable materials such as kiln-dried wood to reduce the amount of material lost to warpage and shrinkage.

At Site clearing leave trees; if that's not possible, chip roots and branches on site.

At design stages floor plans should optimize the use of materials and eliminate redundant materials. Evaluate plans in relation to the efficiency of lumber usage. Framing details should be changed to minimize unnecessary corner studs, excessive lumber at window and door openings and overbuilt lintels.

Modular wall panels, plywood I-beams, and flooring underlay manufactured from recycled cardboard are a few resource-efficient options which can be considered at the design stage. Ordering a 14' joist for a 12'3" span is a waste of money and resources. During construction improve materials storage procedures to reduce wastage through exposure to the elements.

Cardboard, while not a heavy item, is a big volume item - a factor when considering bin costs and landfill capacity. Most cardboard and kraft paper waste is packaging materials. Purchasing articles in bulk containers when possible will reduce waste volumes.

As much as 1 lb. of waste for each square foot of finished floor area is drywall. Changes to design, ordering and installation procedures can reduce drywall waste. Floor plans should be evaluated in relation to standardizing room sizes and minimizing offcuts from board stock.

Masonry is the heaviest element of the waste stream. Reduce the amount of masonry materials discarded on site by improved take-offs and ordering procedures.

Using materials that are made in whole, or in part, of recycled materials is a reduction strategy.

Reuse

Reuse means increasing efficiency by using materials that would normally be thrown out.

For renovators, careful demolition practices will provide many items with a useful lifespan, ranging from doors, windows and decorative mouldings, to sinks and tubs. These can either be sold on site, or to salvage companies.

Framing lumber off-cuts are often reused as bridging, blocking or forming stakes. Excess insulation from exterior walls can be re-used as sound barrier material in interior walls.

On major renovation projects re-use of lumber can reduce the amount of new lumber needed for a project. Sound older lumber can be sold and find its way into storage garages, barns, cottages or other structures.

Off-cuts from joists, studs and sheathing can represent more than a hundred dollars. By making all cuts at a central location, smaller lengths of lumber needed for cripples, lintels and blocking would be readily available - without cutting those specially ordered 16' joists.

Where centralized cutting procedures have been put in place, lumber usage has been reduced by 15% - a significant saving for an average lumber bill of around $9.000.

Off-cuts from insulating materials amount to 5% of total construction waste. Excess insulation should be a contradiction in terms. There is no excuse for throwing out scraps of insulation. Batt-type insulation can be added to attics. Rigid and semi-rigid board can be added to interior walls to act as sound-proofing.

Recycle

Recycling material means making new materials out of old ones. It also provides monetary benefits to the builder and renovator. ''Wastes'' can be sold to recyclers. Where recyclers charge to take the away waste, fees are generally less than at landfill sites. Sometimes, if quantities warrant it, recyclers will provide bins and haul the waste away free of charge.

Any wood products remaining on site can be recycled as feedstock for pressed board, chip board, pressed logs, animal bedding and landscape cover. Most wood grinders will accept wood with nails, staplers or fasteners.

Corrugated cardboard is extensively recycled into boxboard. Many recycling companies will remove cardboard wastes and clean kraft paper where quantities justify. Some companies will provide storage bins to the site.

In various parts of the country, asphalt, wood, drywall, cardboard, masonry, metals, glass and even plastics and paints can already be recycled.

Asphalt shingles have not been recycled to any large degree. The primary use for recycled shingles is as an additive to road paying asphalt.

Paints, solvents, and sealants all classify as hazardous waste. Reduce waste through bulk purchasing and better storage. Left-over paint can be used as a primer coat on future jobs.

Alkyd and latex paints represent 80% of the waste surface coatings. More municipalities will bring facilities on-line in the near future. Waste alkyd and latex paints are recovered and converted into materials which meet or exceed the quality and performance of commercially available paint products - and are safe for use. Paint recycling facilities are now in place in several places, including Vancouver, Regina, Winnipeg, Toronto and Montreal.

Until recently recycling plastics has been a difficult and costly process. The problem is the many different kinds of plastic. Products that use recycled plastics include: drain tile, sump liners, and even wood substitutes. Plastic waste has to be very 'clean' or the load is spoiled.

Drywall recycling plants are now in operation in several parts of the country as drywall can be reprocessed and used as a component of new wallboard. As many of the paints are toxic, some of the recycling facilities work only with clean, unused drywall.

Metal is the easiest component of the waste stream to eliminate. It is commonly recycled throore practical and wide-spread.

New Home Construction

Source separation is the key. Keeping wastes separate as they are produced, and storing the different waste streams independently is the single most important function. Wood has to be piled with other wood; drywall with drywall waste; cardboard with cardboard waste; and so on. Where the waste can be sold, clean material always brings a higher price. A single bin can be used with a series of dividers inside to keep wastes separate from each other.

The common practice of randomly throwing garbage around the site must be discontinued if source separation is to be implemented. A clean site is also a safer site.

Removing all wood waste at the end of framing will result in fewer piles of mixed garbage which need to be hand separated. If sub trades are responsible for placing their wastes in separated piles at the end of each day it will reduce the workload on your clean-up labour crew.

As with all changes on site, your subtrades have to be brought on side. They have to be briefed on procedures, and understand the reasons behind the changes. In some areas, sub-contractors assume responsibility for disposing of the wastes they create. Responsibility for clean-up procedures should be detailed in tendering and contract documents.

Many haulers are aware of options available which can divert wastes from landfill and save disposal costs. It's in the builder's best interest to find the hauler who will provide the best service. The hauler should be treated like another sub-trade. (In some municipalities, building companies have been fined for the actions of their haulers).

Renovation sites

Small bins on wheels have been found to work well. The bins are kept near demolition locations and emptied at the end of each working day. The main problem is to keep the waste from being contaminated by outside people. It seems many people can't resist the site of a large waste bin (that's why some use bins with 'lockable' lids).

Excerpted ''Making a Molehill out of a Mountain: reducing residential construction wastes''

prepared for CMHC. A companion video is also available. CMHC will be offering workshops this fall an winter. Contact your local CMHC or CHBA office for details.

EMR/CANMET NEWS

The Canada Centre for Mineral and Energy Technology (CANMET) is the research and development arm of Energy, Mines and Resources. EMR/CANMET's Buildings Group works with industry to develop and commercialize the technologies to make Canadian houses more energy efficient. With the support of the Buildings Group, Solplan Review presents this information on some current CANMET projects. For more information contact: Energy Efficiency Division, EMR/CANMET, 580 Booth St., Ottawa, K1A 0E4.

What is CANMET? An Introduction

As most readers know, Energy, Mines and Resources Canada has long been concerned with issues involving housing and energy. Few readers, however, will know that in 1989, the research and development people involved in those areas have been gathered under the umbrella of the Canada Centre for Minerals and Energy Technology (CANMET) and renamed the Buildings Group. In this, and subsequent issues of Solplan Review, we'll familiarize you with some of the initiatives underway at the CANMET Buildings Group, beginning with a look at CANMET itself.

CANMET was established in 1907 as the main research and development arm of Energy, Mines and Resources Canada. It is a federal government science and technology centre, serving the mineral, metals and energy industries, with a mandate to improve the use and efficiency of those resources.

CANMET employs over 800 skilled technical and professional staff in seven world-class laboratories across Canada, including, the Coal Research Laboratory in Alberta, the Energy Diversification Research Lab in Quebec, as well as Labs in Ontario and Nova Scotia.

CANMET carries out research and development in partnership with industry and other research organizations (such as NRC and ORTECH), through cost-shared and task-shared projects. Working in partnership helps to avoid duplication of work, capitalizes fully on available specialties and ensures that what is being developed is actually needed 'out there.' The Advanced Houses Program, for example, is being launched in partnership with the Canadian Home Builders' Association.

Advanced Houses Program Now Ready for Builders

The new Advanced Houses Program is now officially launched with a request for proposals from building teams across Canada. The program has been initiated by CANMET, in partnership with CHBA (see Solplan Review Nos. 38 and 39).

ADVANCED HOUSES PROGRAM
PROGRAMME DE MAISONS PERFORMANTES

The purpose of the program is to test new ideas, technologies, products and prototypes in regional field trials to assess their performance and suitability for use throughout the industry. Energy-efficiency and environmental sensitivity are the cornerstones of the program, reflecting heightened consumer demand for environmental features when home-buying or renovating. The new Advanced Houses must perform at least as well as the original Brampton Advanced House. While the Brampton house relied almost entirely on off-the-shelf products, the new Advanced Houses must feature innovative ideas and product prototypes. The best new concepts to emerge from the program and the rigorous energy and environmental requirements will be considered for adoption into an updated R-2000 technical standard.

A three-stage competition will determine which projects will actually be constructed. If you enjoy challenges and the unusual, this may be the program for you. Here's how it works.

Stage 1: Planning and Application (Deadline Oct. 21, 1991). Members of the building industry: builders, renovators, designers, suppliers and manufacturers, together with other interested parties such as the utilities and government agencies are encouraged to form teams and submit a design proposal for a construction or renovation project, including predicted performance data and details on technological innovations. Proposals will be reviewed by a selection committee consisting of representatives of the CHBA, EMR/CANMET, CMHC, Environment Canada, and other technical experts.

Stage 2: Final Design Proposal (Deadline Jan. 10, 1992). The top-ranking proposals will be awarded contracts of up to $10,000 each in order that the project teams may finalize the project, address any deficiencies identified by the selection committee, and forward a completed proposal, including project sponsors, prototype specifications, test results and construction drawings. Winners will be announced in February at the CHBA conference.

Stage 3: Construction and Demonstration (Contracts awarded March 1992). The project teams who rank highest on the final proposals will enter into contracts with EMR/CANMET. Funding will be provided for the incremental costs of innovative features and monitoring. Financing of construction and promotional costs may involve other agencies, such as utilities, manufacturers and other sponsors. Once built, Advanced Houses will be open to members of the housing industry and the public for at least one year, and the performance will be monitored for at least two years.

The technical requirements for the new Advanced Houses are the most rigorous ever developed in North America. In addition to the energy performance and water usage targets, there are requirements for combustion equipment, ventilation and indoor air quality, household and construction recycling, and eco-management. Each project team must demonstrate that it will meet or exceed the technical requirements.

If you are thinking that it all sounds too daunting to attract much interest, think again. Rumour has it that a dozen teams from across the country are already in the planning stages and they will doubtless be joined by others as word of the program spreads. Competition will be stiff for what is shaping up to be a prestigious industry demonstration.

Manufacturers with new products in the developmental stages are asked to contact John Broniek, Technical Coordinator, at the National office of the CHBA (613) 230-3060. Information on these prototypes will be forwarded to the teams selected in the first round. Elizabeth White, project manager of the Brampton Advanced House, comments, "There are many good innovative technologies out there, and several new ideas we were unable to demonstrate in the original Advanced House. I'm hopeful that these ideas, and others, will find an opportunity under the new program."

To obtain a proposal package, which includes an application form and full details on the technical requirements and selection criteria, contact either your Canadian Home Builders' Association or the CANMET Buildings Group in Ottawa. If you have any additional enquiries, call Tim Mayo, Program Manager, at (613) 996-3089.

Window Energy Rating

Comparing the thermal performance of windows has always been a bit of a guessing game. A variety of testing procedures and unsubstantiated claims have clouded what should be a clear decision-making process. However, with the advent of CSA-A440.2, which specifies a method for evaluating windows, and provides a single standard energy rating number (ER), the guesswork will be a thing of the past.

Developed under the auspices of CANMET, the ER will benefit the entire construction industry. As calcuation of the ER requires no additional testing (it can be done by computer simulation) window manufacturers can now improve their designs while the product is still on the drawing board. The ER will allow designers and architects to explore, for the first time, the passive solar potential of high-performance windows by providing a real comparison of the total performance of windows versus walls. And for consumers, the ER creates a level playing field in the marketplace and the chance to comparison shop with confidence.

The standard rating system will also be of interest to agencies with a mandate to support the widespread adoption of energy-efficient windows. For example, Ontario Hydro's new incentive program to encourage retrofit with high-performance windows specifies that, to be eligible, products must meet a minimum performance, based on the new CSA standard.

How the ER Works

To arrive at a true evaluation of window thermal performance, three window characteristics need to be determined: the thermal transmittance, or U-value; the solar heat gain coefficient; and the infiltration rate.

Listing all three factors separately, however, doesn't show their relative importance. In addition, too many numbers makes the process of comparison too complex. Consequently, an equation for evaluating thermal performance based on a single energy number was developed. In it's simplest form, the equation says the ER for a window is equal to solar gains over the heating season minus losses through heat loss and infiltration over the same period of time. An ER of zero, for example would indicate that the window, on average, would gain as much heat as it loses over a heating season.

The chart shows Energy Ratings for five typical fixed wood-frame windows. Notice that the triple glazed, low-E, argon-filled window is a net energy gainer over the heating season. For comparison, an R-20 wall would have an ER of -6 because it has no solar gains, so even windows with a small negative ER can outperform an insulated wall.

The original ER formula was based on an hypothetical 'typical' window, on a typical Canadian house, in a city of average Canadian climate. To calculate the ER for specific locations and orientations, the stan-

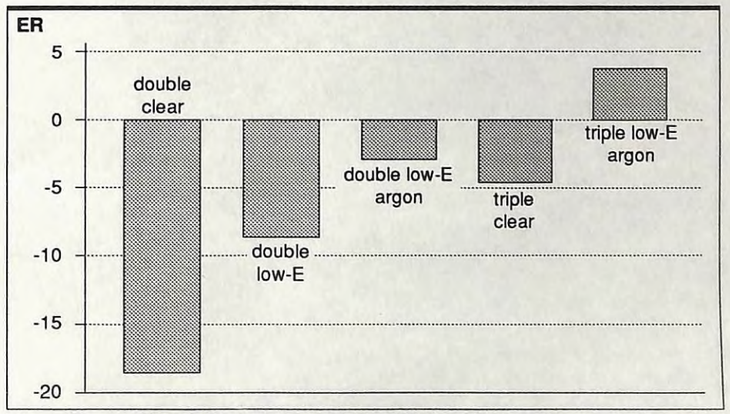


Chart: Energy Rating Performance of Five Typical Windows

dard includes weather factors for 13 cities and solar radiation data for window orientation in 8 directions. To make it easier to use, the Buildings Group at CANMET has developed a computer program, WIN-2000, which incorporates the calculation procedure as well as the weather and solar radiation data. The program can be used by manufacturers as a design tool, and by designers to predict performance in specific applications.

Manufacturers are 100 per cent behind the new standard. Already the industry is working on a labelling procedure that will allow comparison between windows much like the Energuide program allows comparisons between appliances. It is anticipated that a labelling program will be in place within a year.

Workshops on the New Window Standard

CANMET, in partnership with CSA and Canadian Window and Door Manufacturers' Association, is presenting a series of two-day workshops on the new CSA-A440.2 window energy performance standard, to be held from October to December in seven cities across the country.

The first day will include presentations on the new standard and a proposed window labelling program, plus a discussion of the implications for the window industry. Speakers will include representatives from engineering firms, testing laboratories, CSA, EMR/CANMET, and provincial governments. This seminar is intended for those involved in designing, specifying, and purchasing windows such as builders, architects, engineers, government officials and building inspectors.

The second day is a hands-on workshop on window design and energy rating using the WIN-2000 computer program. This session is specifically oriented towards window designers, technical staff, and researchers who need to be familiar with the details of the energy rating procedure and the effect of design changes.

You may register for one or both days. For more information, see calendar of events or contact Lorie Boudreau at CANMET, (613) 996-6157.

TYPICAL ER VALUES		
WINDOW TYPE	FIXED (4'X4')	OPERABLE (2'X4')
Thermally broken, Aluminum frame, clear double glass	-35	-50
Wood frame, Aluminum spacer, clear double glass	-15	-30
Ontario Hydro Incentive Program	2	-13
Wood frame, insulating spacer, double glass, low-e with argon	5	-10
Fiberglass frame, insulating spacer, double glass, low-e, with argon	15	0
Negative numbers mean that on average the window is a net energy loser, positive numbers numbers mean there is a net gain on average		Values are in w/m2

Technical Research Committee News

Energy Standards

The **Measures for Energy Conservation** as a model energy code were prepared in the late 1970's by the National Research Council, but they were largely ignored. The drive to incorporate energy standards has been renewed, and the Measures document is being reviewed again.

A number of new features are being discussed, including quality control elements. For example, an airtightness requirement is being discussed. This would not necessarily mean that every building must be tested. Rather it would mean that if there were a challenge by an authority having jurisdiction, there would be a standard test to be done to prove the building meets the requirements (this is what is already done with many building components).

If anyone has any thoughts or comments on the Measures for Energy Conservation, let the TRC know. This is your chance to provide input on proposed new regulations before they are finalized.

Canadian Home Builders' Association

Renovation Hazards: Lead

There have been reports of children suffering lead poisoning from the dust generated during renovations in the USA. Children are generally the most vulnerable portion of the population when it comes to toxic compounds. It has been known for some time that lead is a serious environmental hazard, and its use is being carefully monitored (this is also why leaded gasolines are disappearing).

The lead presumably is that contained in paints. CMHC is studying the issue to determine just how serious it is and make recommendations for alternate techniques that can be used to minimize problems.

Ventilation Task Group

This task group is continuing with work to develop a CHBA position paper on residential ventilation. Issues that are being investigated include combustion air and make-up air requirements as they are written in the National Building Code and the CSA F326 standard (which is likely to be incorporated in the next edition of the code).

Problems that have been seen with the implementation of the ventilation requirements in the current edition (1990) of the Building Code are being drawn on for the work of this group. The major difficulty is how the code is being enforced because of the ambiguous wording.

One approach being considered is the development of a typical ventilation system design that meets the requirements of CSA F326. This would offer a prescriptive approach that could be included in Part 9 of the code.

Waste Management

The challenge is on! CMHC has been supporting a number of studies, especially in the Toronto and Vancouver areas, on how best to control wastes on new home and renovation construction sites. A booklet and video are in the final stages of production.

The degree of the waste management problem is different in various parts of the country, but there is much that can be done everywhere. As a follow up to the work, there will be a series of training seminars offered to builders in the next few months to help builders apply the information gained. For details contact your local CMHC or CHBA office.

Imported Building Products

The implementation of the Free Trade Agreement with the USA has stirred much controversy in the country. What has been of concern, especially for Canadian manufacturers, is the increasing amount of building materials that are being imported from the USA. While there are Canadian product standards that the materials must meet, some of the imported products do not.

The Federal government has established a national task force to look at all the issues related to US construction products that don't meet Canadian standards. CHBA has been asked and will participate on this task force.

HOT 2000 update

The HOT2000 computer software program was developed to support the R-2000 program. It performs house energy consumption performance calculations for single family dwellings. It is one of the best, most sophisticated and easy to use computer programs anywhere.

As with any software, it can always be improved. One of the main shortcomings of the current version is that while it does a good heat loss calculation, telling you how to size the heating system, it does not tell you if it will overheat (a concern in some situations with new glazing materials and higher overall window areas and insulation levels), or how to size cooling loads.

The new version 6 will do that, as well as incorporate a number of housekeeping changes that make data input more flexible.

The program, still being marketed by CHBA, should be available at the end of September. It will sell for $225 Canadian for the Canadian version, and US$275 for the US version.

The Technical Research Committee (TRC) is the industry's forum for the exchange of information on research and development in the housing sector. Anyone with a problem, technical question of suggestions for areas that need to be investigated is encouraged to contact their local Home Builder's Association technical committee *or the TRC directly To contact the TRC: Canadian Home Builders Association, 200 Elgin St. Suite 502, Ottawa, Ont. K2P 1L5 Tel: (613) 230-3060*

New Floor T&G Tongue and Groove Plywood

A patented new tongue and groove plywood called COFI-FLOOR T&G is being introduced. It was developed in response to builders' requests for an easy fitting tongue and groove product. The larger opening of the groove is the key feature of the new profile.

The new T&G plywood has a stronger tongue and wider groove that speeds and simplifies construction. The development of the profile involved a year long program of design evaluation, prototype testing, mill trials and testing by Canadian builders in all weather conditions across Canada.

It is being produced under licence exclusively by COFI member mills and is manufactured in both Douglas Fir and Canadian Softwood plywood in both Sheathing and Select grades. It is available in two sizes (1200 x 2400 mm and 1220 x 2440 mm) and three thickness (15.5 18.5, and 20.5mm)

A Canada wide marketing program is being launched. Mills will switch manufacturing to the new COFI-FLOOR T&G profile this fall.

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